

CLAIMS

1. A vessel comprising a first stabilizer assembly and a second stabilizer assembly, each stabilizer assembly comprising:

5 at least one submersible at least partially hollow body; and

suspending means for suspending the or each body from the vessel,

10 the first and second stabilizer assemblies being suspended from substantially opposite sides of the vessel.

2. A vessel according to claim 1 wherein the first stabilizer assembly comprises:

15 a first submersible at least partially hollow body and a second submersible at least partially hollow body;

first suspending means for suspending the first body from the vessel; and

20 second suspending means for suspending the second body from the first body.

3. A vessel according to claim 1 or claim 2 wherein the second stabilizer assembly comprises:

25 a first submersible at least partially hollow body and a second submersible at least partially hollow body;

first suspending means for suspending the first body from the vessel; and

second suspending means for suspending the second body from the first body.

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4. A vessel according to any preceding claim further comprising a third stabilizer assembly, the third stabilizer assembly comprising:

at least one submergible at least partially hollow body; and

suspending means for suspending the or each body from the vessel.

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5. A vessel according to claim 4 wherein the first stabilizer assembly is suspended near the bow of the vessel on one side, the third stabilizer assembly is suspended near the stern of the vessel on said one side and the second stabilizer assembly is suspended amidships on the other side of the vessel.

6. A vessel according to claim 4 or claim 5 wherein the third stabilizer assembly comprises:

15 a first submergible at least partially hollow body and a second submergible hollow body;

first suspending means for suspending the first body from the vessel; and

20 second suspending means for suspending the second body from the first body.

7. A vessel according to any one of claims 4 to 6 further comprising a fourth stabilizer assembly, the fourth stabilizer assembly comprising:

25 at least one submergible at least partially hollow body; and

suspending means for suspending the or each body from the vessel.

30 8. A vessel according to claim 7 wherein the first stabilizer assembly is suspended near the bow of the vessel on one side, the second stabilizer assembly is suspended near the bow of the vessel on the other side, the third stabilizer assembly is suspended near the stern

of the vessel on said one side and the fourth stabilizer assembly is suspended near the stern of the vessel on the other side.

5 9. A vessel according to any preceding claim wherein the suspending means is capable of bearing high tension loads.

10 10. A vessel according to claim 9 wherein the suspending means is capable of bearing tension loads of more than one hundred times the loads it is capable of bearing in compression.

15 11. A vessel according to claim 9 or claim 10 wherein the suspending means comprises elongate flexible members.

12. A vessel according to claim 11 wherein the elongate flexible members are chains.

20 13. A vessel according to any preceding claim wherein each body is of elongate shape and has a cross-sectional area greater than 4 m^2 .

25 14. A vessel according to any preceding claim wherein each body comprises one or more closed or closable spaces having a combined volume of more than 50 m^3 .

15. A vessel according to any preceding claim wherein each body comprises at least one ballast tank.

30 16. A vessel according to claim 15 wherein each body comprises a plurality of ballast tanks, each separately ballastable.

17. A vessel according to any preceding claim wherein each stabilizer assembly further comprises at least one fin projecting from the or each body.

5 18. A vessel according to claim 17 wherein the at least one fin is pivotable relative to the or each body to restrict movement of the body upwardly through water more than downwardly.

10 19. A vessel according to any preceding claim wherein each body is substantially prism shaped.

20. A vessel according to any preceding claim wherein each body has a round, preferably circular, cross section.

15 21. A vessel according to any one of claims 1 to 19 wherein each body has a rectangular cross section.

20 22. A vessel according to any one of claims 1 to 19 wherein each body has a square cross section.

23. A vessel according to any one of claims 1 to 19 wherein each body has a triangular cross section.

25 24. A vessel according to any one of claims 19 to 23 wherein one or both ends of each body is substantially conical.

30 25. A vessel according to any preceding claim, further comprising one or more saddles for attaching to the vessel, to support the suspending means.

26. A vessel according to any preceding claim wherein the suspending means of the first stabilizer assembly is

connected to the suspending means of the second stabilizer assembly.

27. A vessel according to any preceding claim, in which
5 only vertical loads are arranged to be transferred from
the suspending means to the vessel.

28. An apparatus for reducing vessel motion comprising
a first stabilizer assembly and a second stabilizer
10 assembly, each stabilizer assembly comprising:

at least one submersible at least partially hollow
body; and

suspending means for suspending the or each body
from the vessel,

15 the first and second stabilizer assemblies being suitable
for locating at substantially opposite
portions of the vessel.

29. An apparatus according to claim 28 wherein each
20 body is of elongate shape and has a cross-sectional area
greater than 4 m².

30. An apparatus according to claim 28 or 29 wherein
each body comprises one or more closed or closable spaces
25 having a combined volume of more than 50 m³.

31. An apparatus according to claim 30 wherein each
body comprises at least one ballast tank.

30 32. An apparatus according to claim 31 wherein each
body comprises a plurality of ballast tanks, each
separately ballastable.

33. An apparatus according to any one of claims 30 to 32 wherein each stabilizer assembly further comprises at least one fin projecting from the or each body.

5 34. An apparatus according to claim 33 wherein the at least one fin is pivotable relative to the or each body to restrict movement of the body through water in one direction more than in another direction.

10 35. An apparatus according to any one of claims 30 to 34 wherein each body is substantially prism shaped.

36. An apparatus according to any one of claims 28 to 35 wherein each body has a circular cross section.

15 37. An apparatus according to any one of claims 28 to 35 wherein each body has a rectangular cross section.

20 38. An apparatus according to any one of claims 28 to 35 wherein each body has a square cross section.

39. An apparatus according to any one of claims 28 to 35 wherein each body has a triangular cross section.

25 40. An apparatus according to any one of claims 35 to 39 wherein one or both ends of each body is substantially conical.

30 41. An apparatus according to any one of claims 30 to 40, further comprising saddles for attaching to the vessel, to support the suspending means.

42. An apparatus according to any one of claims 30 to 41 wherein the suspending means of the first stabilizer

assembly is connected to the suspending means of the second stabilizer assembly.

43. A vessel comprising a stabilizing apparatus
5 according to any one of claims 30 to 42.

44. A submersible body in the form of an at least partially hollow tube, for reducing motion of a water-borne vessel comprising:

10 at least one ballast tank; and
at least one projecting fin for increasing the drag of the body through water.

45. A body according to claim 44 wherein the body is of
15 elongate shape and has a cross-sectional area greater than 4 m².

46. A body according to claim 44 or claim 45 wherein each body comprises one or more closed or closable spaces
20 having a combined volume of more than 50 m³.

47. A body according to any one of claims 44 to 46 wherein the body comprises a plurality of ballast tanks, each separately ballastable.

25 48. A body according to any one of claims 44 to 47 wherein the tube has a round, preferably circular, cross section.

30 49. A body according to any one of claims 44 to 47 wherein the tube has a rectangular cross section.

50. A body according to claim 49 wherein the tube has a square cross section.

51. A body according to any one of claims 44 to 47
wherein the tube has a triangular cross section.

5 52. A body according to any one of claims 44 to 51
wherein one or both ends of the tube are substantially
conical.

10 53. A body according to any one of claims 44 to 52
wherein the or each fin is pivotable relative to the tube
to restrict movement of the body through water in one
direction more than in another direction.

15 54. A stabilizing apparatus comprising a body according
to any one of claims 44 to 53.

55. A method for reducing motion of a water-borne
vessel comprising:

20 suspending at least two at least partially hollow
bodies below the water line from substantially opposite
sides of the vessel.

56. A method according to claim 55 further comprising
ballasting each body.

25 57. A method according to claim 55 or claim 56, in
which the vessel is according to any one of claims 1 to 27
or 43.